

Spine and Core Training:
From Assessment to Badass
Tony Gentilcore, CSCS

Shout Outs to People Who Are
Kind of a Big Deal



- Dr. Stuart McGill, Dr. Craig Liebenson, Eric Cressey, Mike Boyle, Mike Robertson, Bret Contreras, Optimus Prime, Papa Smurf etc.
- Rick Kaselj, Dean Somerset, Dr. Jeff Cubos
- YOU!

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Gentilwho?

- Brief History
 - BA in Health Ed
 - CSCS, CPT
 - Co-Founder Cressey Performance
 - T-nation, LiveStrong, Men's Health, pretty much the best blog in the history of mankind.
- Likes - lifting heavy things, eating dead animal flesh, Jason Bourne, ninjas, old school rap
- Dislikes - BOSU balls, Tracy Anderson, Poodles



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Outline/Overview/"Stuff" You'll Learn

- Managing "general" back pain from assessment to levels of badassery.
 - Not Bad Ass →
- Inside look at CP and how we approach spine and core training
- Exercise Progressions
- Importance of breathing patterns
- Isolate vs. Integrative Core Stability
- Realize that people aren't always delicate flowers
- Coaching the deadlift, squat
- Massive Brain Dump



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Your Guide to TG Speak

- **Baller:** not a reference to one who exhibits a consistent proficiency at, or exuberant love for the game of basketball
 - **Insular** - something that exhibits a general level of awesomeness
- **Sweden** slang for swell. Means getting huge and building muscle.
- **Bio Sciences** concepts in exercise physiology discussed by your local GNC fan boy:
 - Fat burning zone.
 - Tone a muscle, lengthen a muscle.
 - Lower back injuries are lower back issues
- I want to swallow a live grenade
 - that's dumb, or mildly irritating.



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Before We Start.... A Moment of Zen

- "Real education is a process that you do yourself once you get out of the confines of school."

-Thomas Plummer



Antwan 340 Bench

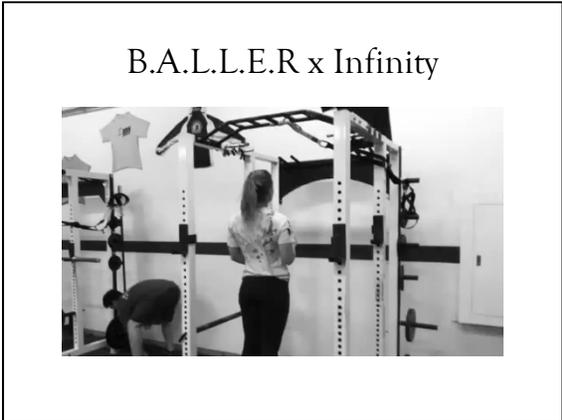


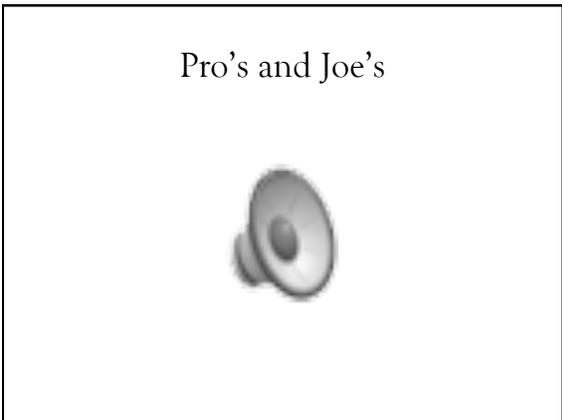
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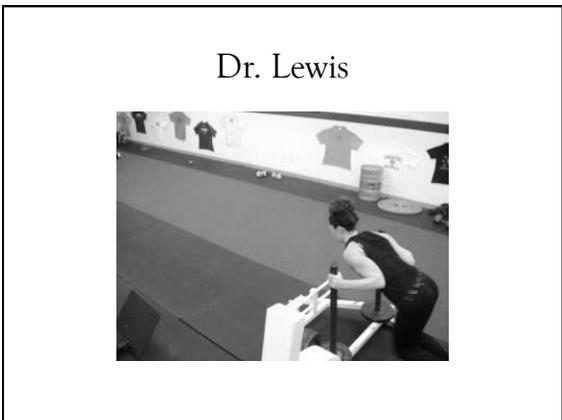


She's 16









Walking Wounded

- 80% of Americans will experience low back pain at some point in their life
- MRI asymptomatic low backs, found 52% had bulge at one level, 38% had more than one level.
- Spondylosis
 - The new ACL epidemic?
 - See this a lot more in younger athletes
 - But really, are athletes just waiting to hit threshold?



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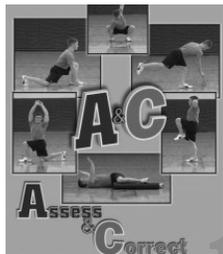
Tada!!!!



- You're probably already training people around disc/spinal injuries.
- Most just aren't symptomatic
 - Spondy: 50-60% of those diagnosed actually report low back pain
- ACTIVE restraints!!!!
 - Lifting heavy stuff kinda works
- Also, people aren't as strong/swole as they think they are.

A (sorta) Brief Word on Assessment

- If you're not assessing, you're guessing
- FMS, Assess and Correct, NASM, etc
- More of a "screen."
- CP Assessment?
 - Overview



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Assessment Cont....

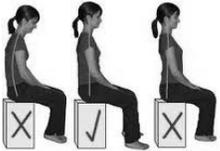


- Objective is NOT to make them feel bad
- Don't jump at every chance to tell them how much of a train wreck they are
- Many get carried away
- Don't go out of your way to look for dysfunction
- Remember, they are still there to get a training effect

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The Jedi Assessment



- Everything is an assessment
- Assess even when they think they're not getting "assessed."
- 23/1 Rule

CP Initial Table Assessment



- Thomas Test
- Seated Hip IR/ER
- Supine Hip IR/ER
- Adductor Length
- Hamstring Length
- Prone Quad Test
- Prone Hip IR/ER
- Shoulder IR/ER (total ROM)
- GIRD*
- Shoulder Flexion

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Extended Version

- Provocative tests
- Q and A - dig a little deeper
 - More pain while sitting or standing? What lifts hurt it more? What else pisses it off? Team Jacob or Team Edward?
- Slump Test, Shear Test, Flexion-Extension?



Provocative Tests



Get Them Moving!!!! Overhead Squat/Lunge

- Screen - FMS
- Are you able to do it?
 - Evaluative vs. Performance
- Compensation patterns?
 - Tuck Under?
 - Mobility or stability issue?
- Lunge Pattern





Push-Ups
The Perfect Assessment Tool?

I Heart Push-Ups



- Keep chin tucked - don't poke it towards the ground
- Abs should stay tight or braced (sometimes I'll gently tap the stomach to help the trainee engage their core)
- Squeeze the glutes (provides more posterior pelvic tilt and keeps people out of lumbar extension)
- Hands/elbows should be directly underneath the shoulders. Likewise, hands should be around shoulder width apart. Knees should be locked and legs in a straight line.

Joint-by-Joint Approach



- Foot - Stability
- Ankle - Mobility
- Knee - Stability
- **Hip(s) - Mobility**
- **Lumbar Spine - Stability**
- **Thoracic Spine - Mobility**
- Scapulae - Stability
- Glenohumeral Joint - Mobility
- You get the idea



Warm-Up

Go hop on the treadmill for 10 minutes
Maybe throw in a few stretches
EPIC FAIL!!!!

Soft Tissue Work/Mobility/Activation

- You're missing the boat as a trainer if you're not spending time doing this with your clients.



Fascia/Trigger Points

- Fascia: inter-webbing from head-to-toe
 - Anatomy Trains
- Trigger Points: contraction knots within taught bands
- Both can cause compensation patterns, poor posture, acute physical pain, restrict mobility, muscle cramps, to name a few



Grenade Approach

- Foam roll, PVC, tennis ball, lacrosse ball, etc.
- Needs to be done everyday (most of the time).
- Order: Foam roll, static stretch, dynamic flexibility



How Does Foam Rolling Work?

- Autogenic Inhibition
 - Protective reflex by Golgi Tendon Organ - mechanoreceptor found at the muscle/tendon junction
 - GTO tells us the level of tension with muscle/tendon
 - Spindle senses length
 - GTO causes muscle spindle to relax when level of tension increases to point of injury
- Poor Man's Massage
 - Trigger points, scar tissue, adhesions
 - Band analogy

Zones of Convergence

Adductors - flexors AND extensors

Glute med/TFL/F*****



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Keys for Rotational Athlete (Big Rocks)

- MOBILE Hips
- STABLE “Core” and Lumbar Spine
- MOBILE T-Spine

- Hammer these points, and you'll instantly see improvement (and have a loyal client to boot)

Thoracic Spine Shenanigans

- Coincidentally, THIS is where you want your Rotation to come from
- T-Spine = 7-9 degrees per SEGMENT (T1-T12), roughly 70 degrees
- Lumbar Spine = 0-2 degrees, 13 degrees TOTAL



Thoracic Mobility

- Lumbar Locked Rotation – Greg Rose, Titleist Performance Institute
- Advantageous because it doesn't allow for any cheating.
- By “locking” the lumbar spine into position, we can't use it to produce more range of motion.
 - Another option = quadruped extension-rotation
- For general population clients, we're looking for anywhere from 50-70 degrees of rotation. Comparatively, for rotational sport athletes, we'd want to see 70-90 degrees - although 90 degrees is freaky.

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Lumbar Locked Rotation





Overhead Test

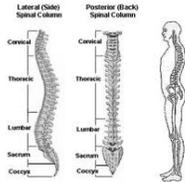
Not so Obvious Source of Lower Back Pain





And We're Doing This Stuff Because.....

Teaching Neutral Spine



- Bit of a misnomer
- "Acceptable" ranges of lordosis and kyphosis
 - In terms of the lay population: men have roughly 3-5 degrees of anterior pelvic tilt (APT), whereas women generally hang out at around 5-7 degrees of APT.
- Upper-Lower Compensation

Quadruped Extension-Rotation



Side Lying Extension-Rotation



Side Lying Rib Roll



Side Lying Windmill



Bench T-Spine Extension-Mobilization



Cat Camel



Dowel Rod Hip Hinge Patterning



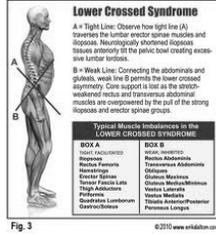
Play-Doh Coaching



- Don't be scared to get your hands on people.
- Don't be a Creepy McCreepypants
- COACH!!!!!!!

Janda Has Something to Say

- Janda's Lower/Upper Cross Syndrome
- Stretch what's stiff/short, activate/strengthen what's weak and inhibited



Upper Body



- Get Long...Get Strong
- Break down tissue
- Lengthen it
- "Cement" length with proper strength training

Get Long

T-Spine Fieldgoal Angel



Side Lying Internal External Rotation



Get Strong

Split Stance Low Cable Row



Yoga Push-Up



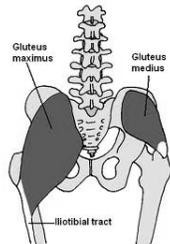
Lower Body



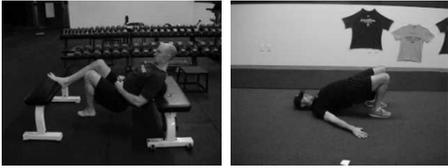
- Focus on hip flexors
- Caveat: tight hip flexors or weak core?
 - Psoas will pull double duty when core isn't doing its job.
 - Holding excessive tone.
 - Stretching may cause more harm than good.

Something Else to Consider Anterior Hip Pain

- Consider different femoral attachment points of glutes and hamstrings
- Glutes have far more control over femoral head
- Femoral Anterior Glide Syndrome
 - Anterior capsule irritation can occur with hip extension if there isn't adequate femoral head control



Booty, Booty, Booty, Booty Rockin Everywhere.



More Glute Work

Terminal Hip Extension

Constant Tension Hip Thruster



Extension Intolerant

- Typically manifests with those who have pain while standing
- Glute activation is KEY - encourage more posterior pelvic tilt
 - Supine Bridge Progressions
 - Birddogs (done correctly)
 - Pull-Through (ISO holds)
- Optimize ROM into hip extension

More Glutes!!!

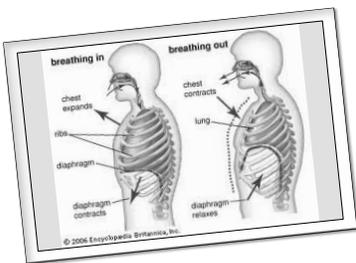
Wall Glute March

Bench Mule Kicks



Reverse Crunch





Breathing Patterns

Why Didn't We Start Doing This Sooner?

Breathing



- First Step of Core Training
- Inner and outer core work in unison
- Diaphragm, Pelvic Floor, Multifidi, Erectors
- Chest Breather vs. 360 Degree Breather

Chest/Shoulder Breathing

- *Shoulder breathing not only elevates our shoulders, but also extends our lumbar spine, even if only minutely. Over the course of a day those small extensions of the lumbar region can add up, creating anterior pelvic tilt and destabilizing the hips and low-back. Instability at the hips has a ripple effect that can affect joints throughout the body, especially the low-back, shoulders and knees. As serious athletes and lifters, we cannot afford to create instability at these key joints - Smitty*

Postural Restoration Institute



- Zone of Apposition
 - Diaphragm presses straight down= optimal spinal stabilization
- Left Rib Flare
 - Diaphragm doesn't push down
- Symmetry is a Myth

Anterior Breathing Drills

3-Month Pose/Drill

Prone Belly Breathing



Supine Belly Breathing Hip Flexed



Kolar Dying Bug vs. Wall



**Lateral/
Posterior
Breathing Drill**
Partner Fingers
Belt

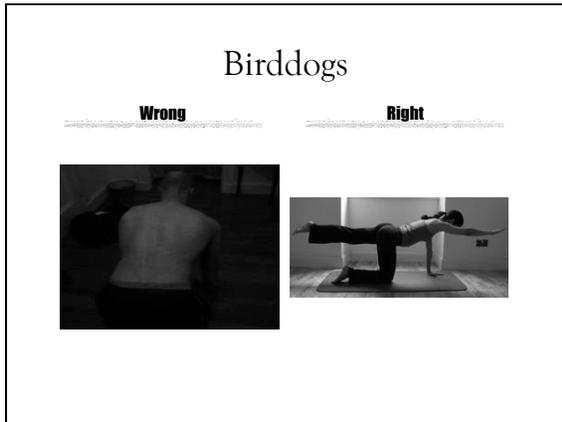


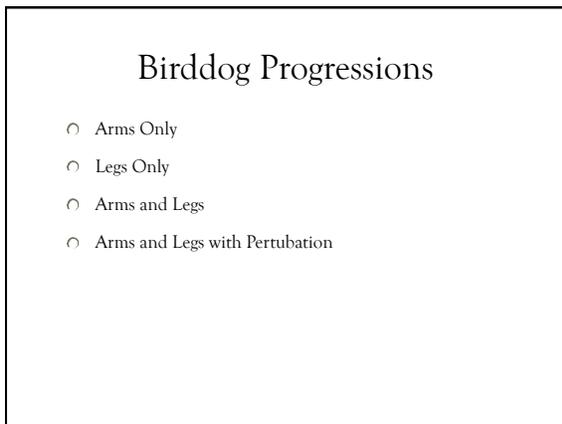
**Foundational/Isolative
Stability**

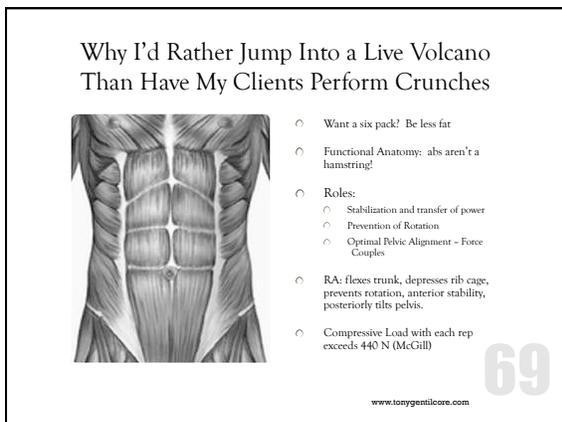
- Need to learn to walk before we can sprint
- Dying/Deadbug Variations
- Birddogs
- Planks

Deadbug Variations









Core Training 101 (Cliff Notes Version)

- Anti-Extension: plank variations, fallouts
- Anti-Rotation: chops/lifts, Pallof Press variations
- Anti-Lateral Flexion: farmer carries
- 1-Arm Variations - iron work

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Planks

- Efficacy towards low back pain
 - Prone: 90-120s
 - Side: 45-60s
 - Symmetrical?
- Rate of diminishing returns
- Longer or more challenging?
 - Regular, 1-legged, perturbation



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Planks



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Alligator Walk



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Stir the Pot



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Bottoms Up vs. Top Down

- Reverse Crunch
- Most Underrated exercise?
- Flexion ain't all that bad.
 - EC: flexion to neutral is much different than flexion from neutral



Integrative Stability

- Chops/lifts, pallof, offset loads, carries
- Once the small guys do their job, the big boys can come out to play

Cable Lifts/Chops

**Half Kneeling Cable Lift/
Chop**

Tall Kneeling Cable Lift/Chop



Taking it a Step Further



Pallof Press

Pallof Press Alphabet



Pallof Press Squat



Pallof Pressanity

Lateral Lunge Pallof Press with OH Driver



Pallof Press ISO Walk Out



Offset Loading

1-Arm Flat Press



2-Point Row WITH HAIR



2-Point Row (Real Time)



Offset Loading

Offset Bulgarian Split Squat

Offset 1-Arm, 1-Legged DB RDL



Carry Your Face Off

Suitcase Carry

Waiter Carry



The Perfect Warm-Up?

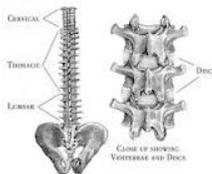
Exercise	
Suitcase Carry	20-30 yds/arm
Wall Hip Flexor Mobilizations	10/leg
Racked Carry	20-30 yds/arm
Deadbug Variation	8-10/side
Waiter Carry	20-30 yds/arm
T-Spine Variation	8-10/side
Crossbody Carry	20-30 yds/arm
Plank Transitions	8-10/side
Goblet/Heartbeat Carry	20-30 yds/each
Give someone a hug	Infinity

To Arch or Not to Arch That is the Question!



- When you add load, the game changes.
- Capozzo et al. found that squatting to parallel with 1.6 times body weight (what might be "average" for the typical weekend warrior) led to compressive loads of ten times body weight at L3-L4. That's 7000N for a guy who weighs about 150. Meanwhile, in a study of 57 Olympic lifters, Cholewicki et al. found that L4-L5 compressive loads were greater than 17,000N.

Squats and Your Spine



- Spine can actually handle compression "kinda" well
- McGill: the spine doesn't buckle until 12,000-15,000N of pressure is applied in compression (or 1,800-2,800N in shear)
- NOT taking into consideration active restraints
- Compression + Flexion = your spine hates you.
- Mechanical advantage

To Arch or Not to Arch

- Making active restraints stronger is the key!
- Flexion IS okay
 - Know the difference between flexion and end range flexion
- If someone can't squat to depth without going into lumbar flexion, can they still squat?
- Address hips. Ankles, groove technique
- Remember: Females have an average of 5-7 degrees of anterior pelvic tilt, whereas males are more like 3-5 degrees - meaning that females will naturally be a bit more lordotic.
- If anything, "arch" cue keeps people in neutral



Grooving the Squat

Soap Box Rant

HIP HINGE!!!!

Teaching the Hip Hinge

Dowel Rod Patterning



Band Sit-Back



Grooving the Squat

Prying



TRX Squat



Squat Progressions

Goblet Squats



Plate Loaded Box Squats



Box Squats are the Shiznit

- Perfect for grooving technique
- Keeps people honest
- Safer than back squat?
 - [Strength Cond Res.](#)
2012 Apr 10



Fixing the "Tuck Under"



- Teach neutral spine
 - How to get there?
- Address hamstrings, core stability, and ankles!
- Adjust lifts to the lifter



Deadlifts!

If I had to pick one....
 Good, the Bad, the Ugly
 Benefits? Let me count the ways

Trap Bar Deadlift

- Handles allow for less hip flexion/ankle restrictions
- MUCH easier to teach/maintain neutral spine
- Less shear on spine due to COG (inside bar).
- Caveat:
 - it's not a squat.
 - Can't hump the bar.



SUMO Deadlift



- Great for those with mobility restrictions
- Guys who are built to squat and bench (short limbs, long torsos) like this version - don't have to go so low.
- Wider stance, toes out = easier to maintain neutral spine.
- Caveat: eats up the hips.

Conventional Deadlift

- Most technically advanced
 - Most shear load
 - COG more anterior
 - MUST have ample ankle, hip, thoracic mobility to get into proper position
- Lack of the above = lumbar flexion
- End range flexion?
 - Where is the meat?



Lumbar or T-Spine?





Coaching the Squat and Deadlift

Top 5 Cues: Deadlift

- 1. Push Hips Back (DL NOT a Squat)
- Squats = more linear relationship between hip and knee angles. Or, more synergistic movement
- DL = 3 distinct phases: knees at lift off, hips at knee height, both at lockout
- 2. Pull Chest Tall
- 3. Stiffen the Upper Back
- 4. Tuck the Chin
- 5. Hump the Bar

Top 5 Cues: Squat (Okay, I Lied)

- Set Up Like You Mean It!
- Get Your Air (REMEMBER: 360 expansion)
- Pull DOWN on Bar.
- Sit Back, Knees Out
- Land Soft (broken glass)
- Maintain Tension
- Explode through Heels
- Chin Tucked
- Finish Tall/Get Hips Through

How to Prevent Back Issues (a Review)

- Avoid lumbar flexion, especially with rotation and compression.
 - Improving ankle mobility
 - Improving t-spine mobility
 - Improving hip mobility
- Use "usable" ROM - stabilize lumbar spine within ROM it has
- Deload the spine
- PREACH NEUTRAL SPINE!!!
- Be leery of early AM exercise
- Give People a training effect

And, That's It

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